VOL. VI. No. 11. MAY 27, 1909

THE JOURNAL OF PHILOSOPHY
PSYCHOLOGY AND SCIENTIFIC METHODS

CRITIQUE OF COGNITION AND ITS PRINCIPLES[1]

THE German philosophical terminology distinguishes between "Erkenntnis" and "Kenntnis, Wissen"; this distinction, though varying with the different authors, has been of high importance in the development of idealism; yet there seems to be no accepted fixation in the English language for these two concepts. I shall in this paper use cognition for Erkenntnis, as knowledge already stands for Kenntnis, and shall place the distinction between cognition and knowledge in the concept of system. Knowledge that satisfies the group of conditions for which the concept of system stands, is cognition. This group of conditions and therewith the definition of cognition I shall not give here, but instead point out particular instances of cognition: mathematics, mechanics stand as examples and also as parts of cognition. It seems advisable, in order to give determinateness and stability to the concept of cognition, to restrict it at first and to relate it to mathematics and mechanics only, with the provision, however, of properly extending it afterwards. Whether such an extension is possible, and what the scientific methods of such an extension are, is the subject of a special investigation; but whatever the decision of such an investigation may be, it will not affect the inquiry we are concerned in, which is independently necessary. Systems in this paper, therefore, are always systems of mathematics or of mechanics.

By "logic of cognition" I understand the systematic construction of the foundations of cognition from the true origin. This logical origin is the concept of "problem." Inasmuch as the problem may be conceived as generating a system, I call it the "generating problem." The construction of the foundations may be considered as the positing of the conditions necessary and sufficient for the solution of the problem of cognition. These conditions are the axioms or principles; they are not arbitrary (mere "conventions"), as some take it, but necessary—though in a sense of the word different from the necessity of a theorem: theorems derive their necessity from axioms,

[1] Read before the American Philosophical Association in 1902; published with several additions.

they are necessary *from;* axioms derive their necessity from the generating problem, they are necessary *for,* namely, for the solution of the problem. There is no necessity beyond the problem.

Logic of cognition is purely constructive; it posits nothing as given but its problem; and whilst it thus appears as the true basis of the system of cognition, which it makes possible, it requires a new discipline preliminary to it which establishes its problem, determines its method, and prepares its material. For construction is not generation out of nothing, nor is the logical origin a psychologically new beginning. This preliminary discipline establishes the true interrelation between logic of cognition and cognition as it is represented in its literature; and in this interrelation the advance toward the ideal of cognition is accomplished.

By "critique of cognition" I understand the examination of the actual, or possible, systematic solutions of the problem of cognition *according to principles.* This critique is the required preliminary discipline and is established with reference to a possible system of logic of cognition. "Critique of cognition" posits cognition as given. The distinction between a critique of cognition and a logic of cognition consists, therefore, in this: the first examines, the second constructs.

All criticizing is measuring and therefore presupposes a standard. According to the standard taken, there are three kinds of "critique" possible: the external, the internal (or immanent), and the systematic. The external takes as standard any other system and measures the agreement or disagreement with it. The internal measures a system by itself in the agreement or disagreement of its parts. The systematic takes as standard a complete set of critical principles to determine the objective value of the system. "Critique of cognition" is, by definition, of the third kind.

It is our task to exhibit such a set of principles. We are guided by the idea with which we started, that cognition is essentially systematic; the principles by which any system may be criticized are, therefore, the principles of "critique of cognition," and we obtain them if we consider a particular instance and remove the specializing conditions.

In the introduction to his "Prinzipien der Mechanik," Heinrich Hertz has given such a set of principles and applied them to systems of principles of mechanics. But they are based on a metaphysical assumption of which "critique of cognition" can, and therefore ought to, be free.

The principles by which the value of a system may be judged seem to me to form four groups of conditions; I call them: the conditions of logical *purity,* of logical *completeness,* of logical *simplicity* and of logical *truth.*

Conditions of Logical Purity

1. *The concepts must be well determined.*—Derived concepts are determined in their definitions. Fundamental concepts can not be defined; methods must be indicated in the system for their determination and it is not sufficient to enumerate them in the beginning as "primitive concepts," as Peano and his school have done.

2. *The definitions must be good.* A definition is the establishment of a group of conditions between certain elements. The introduction of a new name for this group of conditions and therefore the form of an equation which Peano[2] and others have declared as essential, does not concern the true nature of a definition.

A definition is good if it satisfies the following conditions: (*a*) Its elements must be well determined; (*b*) the conditions to which the elements are submitted, must be independent, *i. e.*, they must all be necessary (indispensable); (*c*) all independent conditions must be stated, *i. e.*, the conditions must be sufficient; (*d*) the conditions must be consistent. If we take, *e. g.*, the definition: A circle is a curved line whose points are equidistant from one point, it may satisfy condition (*a*), and it does satisfy condition (*d*) (because we can construct lines which satisfy the definition); but it does not satisfy conditions (*b*) and (*c*), because the condition "curved" is deducible from the others (therefore not independent), and the condition "equidistant" is not sufficient to determine a circle, since it includes, besides, each part of a circle and all curves on a sphere in the definition.

3. *The fundamental as well as the special conditions of the system must be consistent.*

4. *The conclusions must be correct.* This condition comprises: (*a*) That the conclusions satisfy the rules of the syllogism, which, using symbolical notations, have been summed up in one formula, the "argument of inconsistency," by Mrs. Ladd-Franklin;[3] (*b*) that the limiting conditions, under which the premises are valid, are observed; (*c*) that no principles are used except those which are explicitly presupposed, or proven as theorems.

These four conditions determine the logical purity of the system with respect to its generating problem; they apply, with obvious modifications, as well to the generating problem itself. In particular, the non-satisfaction of the condition of consistency (3) leads to so-called null-systems.

[2] See "Les Définitions Mathématiques, Bibliothèque du Congrès International de Philosophie," Vol. III. (1900), p. 279. See also: "Formulaire," Vol. I. (1895), p. iv.

[3] See "Studies in Logic," by members of the Johns Hopkins University, p. 40.

Conditions of Logical Completeness

1. The fundamental conditions of the system itself, as well as the special conditions of each theorem, must be sufficient; *i. e.*, all special problems (called "facts" in physics) within the realm of the generating problem must be deducible from the system. The method of ascertaining the satisfaction of this condition is the method of the constructed exception (called "experiment" in physics). This method will indicate sufficiently the importance of the condition for physics; it is equally great in mathematics, and closely allied to the "spirit of exactness."

This first condition determines the completeness of the system with respect to its generating problem. A second condition requires the completeness of the generating problem itself and may be formulated thus:

2. All special problems which belong to the realm of the generating problem must be contained in this realm of the generating problem. The difficulty of the condition lies in this: How can we determine that a special problem belongs to a realm unless it is actually contained in it? It is the same difficulty as the following: How can we determine that a definition is not complete? Whilst this condition has shown its influence in the history of science, it is not so evident for the reason that the generating problems are but rarely explicitly stated. Yet the definition of the science will always contain it. Take, *e. g.*, "geometry is that part of mathematics which is concerned with spatial magnitudes." This generating problem violates our condition because it does not contain the problems of modern projective geometry. Or, if we should formulate the generating problem of geometry, with modern geometers, purely projectively, and accept Mr. Bertrand Russell's proof that the projective definition of distance only superficially contains the Euclidean, then we should maintain that the special problems of Euclid's geometry are not all contained in the realm of our generating problem. In both cases the system might be complete so far as our first condition of completeness is concerned. It is evident that the method of testing the satisfaction of this second condition is the same as that of the first.

Another method of testing the satisfaction of these conditions of completeness is to show that the system embraces another system which has already been tested. One system embraces another if the content of the second can be deduced from the first; *e. g.*, to show that a set of axioms is complete for metrical geometry, it is sufficient to show that from the set an established set can be deduced.[4] The

[4] *E. g.*, Professor J. Royce's paper: "The Relation of the Principles of Logic to the Foundations of Geometry," in *Transactions of the American Mathematical Society*, Vol. 6 (1905), No. 3, pp. 410 ff.

method is, however, applicable only under certain restrictions which can not be discussed here. It has sometimes, though mistakenly, been used to prove the *possibility* of a system.[5]

Conditions of Logical Simplicity

1. *The fundamental conditions must be simple.* The work of modern mathematicians has shown that an interchange between principles and propositions is possible, so that different solutions of the same generating problem can be obtained by a proper change in the choice of theorems as principles. However, there seems to exist between the principles (and the concepts to which these principles correspond) a definite relation such that we call the one simpler, the other more complex. It must be possible to determine this relation in the various concrete cases, though it is hard to state it in general. If it is found, our condition gives preference to the system which has the simpler principles and concepts; so that it is not of equal value for the system, though it may be logically indifferent, which is made the foundation and which the derived. As an illustration note Heinrich Hertz's objection to Hamilton's principle as a fundamental principle of mechanics.[6]

2. *The fundamental conditions must be few.* Either the number of principles may be different in the different selections of principles referred to in the preceding condition, (1), or auxiliary principles may be required; preference is given by our condition to the smaller number, unless it is in opposition to the preceding condition. As an illustration see Professor E. V. Huntington's definition of a group,[7] as compared with the one given by H. Weber in his "Lehrbuch der Algebra,"[8] or v. Helmholtz's objections to W. Weber's theory of electrodynamics.[9]

3. *The fundamental conditions must be mutually independent ("necessary").* The method of ascertaining the satisfaction of this condition consists in the construction of a system which satisfies all

[6] See H. Hertz, "Prinzipien der Mechanik," p. xxiv: "Dass aber die gegebene Zusammenstellung in jeder Hinsicht eine *mögliche* ist, beweise ich dadurch, dass ich ihre Folgen entwickle und zeige, dass bei voller Entfaltung sie den Inhalt der gewöhnlichen Mechanik aufzunehmen vermag. . . ." It is, however, clear, firstly, that therewith the possibility of one system is merely set in relation to that of another; secondly, that for this a special principle would be required, which may be formulated thus: if from a set of conditions we can deduce possible results, the set is itself possible; and thirdly, that the real question at issue is not the possibility but the relative completeness of the two systems.

[5] "Prinzipien der Mechanik," p. 27.

[7] *Bulletin of the Am. Math. Society* (1902), second series, Vol. VIII., No. 7, pp. 296–300.

[8] Vol. II. (1899), pp. 3–4.

[9] H. Hertz, "Mechanik," Vorwort, pp. x–xi.

the conditions with the exception of the one whose independence is in question. The application of this condition to Euclid's axioms of geometry has led to new systems of geometry and to a revision of the foundations of Euclidean geometry.

The first three conditions of this group determine the simplicity of the system with respect to the generating problem. A fourth condition requires the simplicity of the generating problem itself, and may be formulated thus:

4. *The realm of the generating problem must contain only those special problems which belong to it.* The difficulty of the condition lies in this: How can we determine that a special problem does not belong to a realm unless it is actually not contained in it? It is the same difficulty as the following: How can we determine that a definition is too broad?

This group of conditions has been of the utmost importance in the development of science. If we consider that any system can be made complete by the addition of auxiliary hypotheses (conditions), it will be evident that this group is the necessary correlate to the preceding group (of completeness), and not merely the satisfaction of an esthetic demand, as some hold.

Conditions of Logical Truth

1. The system must be a solution of its generating problem such that the preceding groups of conditions are satisfied.

2. The generating problem of the system must be a special case of the general problem of cognition, *i. e.*, each special system must be a special problem within the realm of the generating problem of cognition.

It is evident from these conditions that truth is the highest of all the critical conditions, and that the problem of "critique of cognition" could be formulated as the determination of the truth-value of a system. It follows further (from 2) that it is not the task of the single disciplines to determine the truth of their systems. This conclusion is so paradoxical and is liable to meet so strong an opposition, especially from the physicists, that it is necessary to consider it from another point of view.

Whatever these conditions may be, the proper method of determining truth, at least in physics, seems to be the *experiment*. It can easily be shown, however, that the experiment, whilst it is indeed the most powerful means of convincing us of the possible truth of a system, is nothing but the method of the conditions of completeness. In so far, and in so far only, as their satisfaction is required by the condition that "the system must be a solution of its generating problem" (1) can the experiment be considered as a negative criterion

of truth. Foucault's experiments to determine the velocity of light in water left no doubt about the superiority of the undulation theory. They did not, however, prove the truth of Huyghens's theory, but only the incompleteness of Newton's; or, as Foucault himself expresses it, "The last conclusion which I draw from my experiment, is, therefore, the proof that the emission hypothesis is not in harmony with the phenomena of light." Again Fresnel's experiments in the interference of rays of light, as they were a direct consequence of the undulation theory, strongly increased our conviction of the truth of this hypothesis; but what they proved is the completeness of Huyghens's system with respect to a certain group of special problems.

This granted, the conclusion might be drawn that the conditions of completeness are the conditions of truth.[10] It is obvious, however, that this would mean to ignore the other conditions. But we are thus led to the question: Is the set of conditions that we have given complete, is it simple, pure, etc.? In other words: this set of conditions[11] can itself be considered as a system and therefore be examined by its own principles. I call it the "self critique" of the critical principles.

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CLEARNESS, INTENSITY, AND ATTENTION

MUCH has been made in late years of the distinction between intensity and vividness, or clearness, which attracts our notice in the study of attention. But it appears clear to the writer that the distinction is one merely between intensities of different types. Most of the studies of our psycho-physicists in this direction are given to sensational intensities, and in this field they observe intensity as contrasted with clearness, vividness, distinctness, but fail to take sufficient note of the fact that this contrast appears in other realms than the sensational.

Titchener tells us[1] that "the problem of attention centers in the fact of sensible clearness": and[2] that "clearness is an independent attribute of sensation" which "may vary independently of intensity"; although "change of clearness always involves a change of intensity as well." One can not but hesitate to question so positive a statement of so thoroughly equipped and thoughtful a psychol-

[10] This is essentially, if I understand him correctly, Professor James's theory in his book on "Pragmatism."

[11] As was first pointed out to me by Mrs. Schmidt.

[1] "The Psychology of Feeling and Attention," p. 182.

[2] *Op. cit.*, p. 219.

ogist; and yet one is naturally led to note the limitation of his view, as thus stated, to sensational considerations, and to recall that a large part of our attention experiences are within the realm of thought and, therefore, in our view non-sensational. One who does so must at once concede that the distinction is one that is most commonly and very frequently observed in cases where sensations are compared with ideational presentations, and that the sensations which, in distinction from the sensations called intense, are called vivid (*e. g.*, those located in the retinal margin) are closely allied with ideational presentations. It seems clear that the frequent experiences of this comparison between sensational and ideational presentations in every-day life give the basis for the distinction considered when careful laboratory tests are made.

Where intensities of diverse types of presentations appear coincidently we should surely not be surprised to find them contrasted and given different names. An elemental intensity corresponds with an emphasis of activity within a part of the nervous system, and such emphases are more likely to be distinctly marked in those parts of the nervous system which receive stimuli directly from the environment than in parts which receive their stimuli from within the system itself. As the emphatic activities in the nervous parts which are in direct relation to the environment correspond with our sensations, we should expect to make note of intensities most frequently in connection with sensations—as is evidently the case; and we should find ourselves naturally considering sensational intensities when the thought of the meaning of the word intensity occurs. If then we are inclined to give special names to intensities as attached to special classes of presentations, we should naturally use the word intensity to refer to sensation, and choose a special name to apply to the intensities of a less narrow nature which are due to action within the mass of the psychic system, when the two forms are placed in contradistinction. And this, in my view, we do in setting "intensity" over against "vividness," or "clearness."

The meaning of this may be more clearly seen if we consider in some detail the contrast between sensational and ideational intensities. An intense presentation appears within some minor psychic system. This minor psychic system may be of greater or less breadth. It is to be expected, therefore, that comparison will at times be made between an intensity within a narrow minor psychic system (let us call this intensity N) and an intensity within a broad minor psychic system (let us call this intensity B). It may well happen also that the intensity N, which is related with the narrow system, may be one which is strongly influenced by the action of physical stimuli and not markedly affected by the reaction of the

related psychic system as a whole: while, on the other hand, the intensity *B*, which is related with the broad system, may be one which exists as such almost entirely because of the reaction upon it, as a whole, of the psychic system with which it is related. *N*, that related with the narrow system, may well be a marked case of what men usually, but without great accuracy, speak of as involuntary attention, *e. g.*, the light of the candle upon which my eyes are fixed —the twinge of neuralgic toothache caused by the stimulation of an exposed nerve. *B*, that related with the broad system, may well be a marked case of what we all agree to call marked voluntary attention, provided the intensity is related with, and supported by, the broad mass of the psychic system as a whole, *i. e.*, by the self.

Now two such intensities may well appear at what seems to be one and the same moment; and we should not be surprised to find their contrast leading us occasionally to give them different names as we have seen that we do, using the term intensity to refer to the narrower sensational intensity, and the word vividness to refer to the broader ideational intensity.

Vivid *B* and intense *N* as differentiated from *B*, are both partial presentations. The characteristic of the vivid *B* is this, that at the moment observed it persists in attention notwithstanding the fact that, when both *N* and *B* are held in reflection and compared, *B* is appreciated as less intense than *N*, so that we speak then of the intense content *N* as contrasted with the vivid content *B*. What we note *in this moment of comparison in reflection* is the fact that attention becomes fixed upon *N* (the so-called intense element) as more emphatic than *B* (the so-called vivid element), and that in that moment *B* tends to disappear from attention, while *N* tends to persist. But at the same time we also note that *apart from this moment of reflective comparison* the reverse is the case, *i. e.*, the "vivid" *B* holds attention as against the "intense" *N*.

We often experience cases where attention to partial presentation *N* becomes approximately equivalent to attention to partial presentation *B*. It is in such cases of balanced attention that the psychic system is appreciated as reacting to fasten *B* in attention to the exclusion of *N*, or, in other words, to sustain the "vividness" of *B* to the exclusion of the importance of the "intense" *N*.

The actor on the stage may have a sharp neuralgic toothache which he may experience during the whole time given to his acting, but the relatively unimportant psychic systems involved with the apprehension of the toothache, as compared with the very broad and important psychic systems involved in the acting of his part in the play, may lead him to say that while the toothache was more intense, the conception of his part in the play was more vivid. In

the one case the intensity was due to a physical stimulus and involved relations with relatively narrow psychic systems; in the other case it was the reaction of the mass of the whole psychic system that gave the importance to the psychic element and gave to it its intensity, which in such cases we call its vividness, or clearness, as you will.

It thus appears that the facts upon which Titchener bases his statements, above quoted, may all be interpreted in terms of the shifting of attention.

When we look upon the clearness of a sensation as distinct from its intensity we are considering the relation of the sensation to a very different psychic field than that involved when we consider what we call the intensity of the sensation as such.

Clearness, I take it, is but another name for vividness or distinctness. Both of these are terms employed to describe intensity in fields of a broader nature than those in which the typical intensity, viz., sensational intensity, appears. When we consider clearness or vividness or distinctness we are dealing with attention in a field of broader significance than when we consider intensity; in the latter case we deal with attention in a field of narrower significance.

That no such distinction as that made by Titchener will hold seems clear in the very fact which he asks us to note, viz., that "change of clearness always involves a change of intensity as well." This in my view is but another way of saying that what in one field appears as a change of what we commonly call clearness or vividness, in another field appears as a change of what we commonly call intensity.

If we thus agree that intensity and clearness are names for the same characteristic in different settings, then we find no difficulty in accepting Pillsbury's statement,[3] that "attention is fundamentally a change in clearness of some one phase or aspect of a mental process."

If we thus use the word intensity as the generic term, we may then say that attention experience appears as not identical with intensity, although it involves intensity; it is intensity as related to the manifoldness of all the rest of the field which makes the total presentation of the moment of consideration. Both the focus and the rest of the field of attention are noted as involved in the whole complex presentation of the moment, the focus being the center of most marked intensity.

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[3] *Op. cit.*, 1, 11.

DISCUSSION

"ANTI-PRAGMATISME"[1]

IT is the contention of some pragmatists that the social and ethical implications of extreme intellectualism are essentially undemocratic and hierarchical. They insist that the conception of thought as a totally distinct species of activity, complete and sufficient unto itself, capable even of "furnishing its own material," leads in social theory to the notion of thinkers as constituting a distinct and "privileged" social class, a sort of priestly "caste" (employing the term frankly used by the author of "Anti-Pragmatisme") whose function is to keep the fires burning on the altar of "Pure Truth." They believe that a "caste" system of psychology and logic involves, both as antecedent and consequent, a "caste" system of society.

And it is to be noted, they add, that this view of thought and the thinker can not plead in its defense the principle of "division of labor." Division of labor means an interdependent differentiation of function in a common process working toward a common end. But by hypothesis pure thought pursues only its own end, by its own method, and acknowledges no dependence upon, nor cooperation with anything else. The thinking class, as such, is a law unto itself. It need render no account to the others. But the others must render an account to the thinker. For the thinker finds it no less difficult to live by thought alone than by bread alone. And somebody must furnish the bread. It has always been the boast of the intellectualist that pure thought "bakes no bread," and many are beginning to doubt whether it procures for us either God, freedom, or immortality. However, these doubters recognize that thought has its *part* in baking bread and in procuring God, freedom, and immortality.

But usually when pragmatists point out these reactionary social "consequences" of extreme intellectualism, they are promptly repudiated. And the vehemence of these rejections would seem to imply that if such "consequences" *did* follow they would constitute a sufficient refutation (rather "pragmatic" in character to be sure) of the doctrine.

In view of this, it is interesting to open a volume on "Anti-pragmatism" and find that these reactionary social implications are frankly, not to say naïvely, accepted at the outset and preached throughout with evangelical fervor as the only gospel of social salvation.

"*La thèse qui a preside à la composition de ce livre, à savoir qu'il y a un conflit entre la vérité intellectuelle et la vérité morale, conflit*

[1] "Anti-Pragmatisme," by Professor Albert Schinz. Paris: Félix Alcan, 1909. Pp. 309.

que toutes les ratiocinations du monde ne supprimeront pas, car il est irréductible." (p. 6.)

"*La vérité n'a rien à faire avec la vie.*" (p. 195.)

The subtitle of the volume is: "Examen des Droits Respectifs de L'Aristocratie Intellectuelle et de la Démocratie Sociale." And the reader is not left long in doubt about the author's view of these "Droits Respectifs." The legend for the introduction is: "Odi profanum vulgus et arceo." Of another chapter (p. 195) the prologue is: "La civilisation a été de tout temps une œuvre aristocratique, maintenue par un petit nombre." Again: "l'idéal démocratique. . . . Condamne le race Humaine à se couper la tête." (p. 219.)

If, in these days of mixed motives and crossed wires in philosophic thinking, such simple consistency were found in the premises of a volume by a professor of philosophy it would be regarded with suspicion. The reader would fear a trap. But there is no question of Professor Schinz's ingenuousness. And the pragmatic critic might make short work of comments by saying "Very well, if you want a 'caste' system of society, that's the kind of theory to hold."

This charming absence of "the art of philosophic dissimmulation" further appears in much of Professor Schinz's defense of intellectualism, which is openly (what the pragmatist would insist it must be implicitly) pragmatic in its method. Intellectualism is to save us from the "consequences" of pragmatism—especially the American brand of pragmatism—which are: a crass materialism, a charlatanistic "opportunism," and philistinism in general, in which all moral control breaks down, and which is to end in "humanity cutting off its own head."

With a cheerful and jaunty pessimism Professor Schinz confesses that he believes that his defense of pure thought is a forlorn hope. He, too, is persuaded that "pragmatism has come to stay"; not because it is true, "but precisely because it is false," for "from the social standpoint, the false is preferable"! (p. 195 ff.) "The victory is not to him who has the better order of syllogisms, but to him who has the best vitality." (p. 209.) "What a beautiful reductio ad absurdum of pure thought!" the pragmatic reader will exclaim. "Is falsehood then more vital than truth? Will humanity have more vitality with its head off than on? Is the syllogism a symptom of general debility? And what of the author's plea for happiness? Is the syllogism the archetype of human bliss? And what shall we say: 'Better fifty years of pure intellect, than a cycle of social-comradeship?' " (Though doubtless the syllogism plays a *part* in social-comradeship.)

As for the general issue of democracy *versus* aristocracy, the

democratic reader will probably say that most of Professor Schinz's case for aristocracy rests upon a very antiquated conception of democracy, viz., as "the intellectual and social equality of all individuals." Also they will say that in his analysis of the evils of democracy; *e. g.*, bossism, as due to the persistent, but ignored, and therefore mutilated, working of the principle of aristocracy under an attempt at democracy, the author seems blissfully unaware that by the same token these evils, especially that of bossism, might be the symptom of a handicapped and mutilated working of democracy; that by the same logic, bossism might be diagnosed as social appendicitis due to the survival in the body politic of the hypertrophied veriform of an aristocratic regime. And they will add, that the cure for this trouble is now fortunately well recognized.

Of the more technical presentation of the author's standpoint many will not only fail to find anything new advanced in support of intellectualism, but are pretty sure to complain of a lack of anything like an adequate appreciation of the real issue. And in support of this they will cite that the only exposition of the nature and meaning of purely "intellectual" and "scientific" truth as opposed to "social" or "moral" truth, is an appeal to the formal law of contradiction and to Kant's "irreducible" antinomies of space, time and causation. (Though many think that even Hegel made a pretty good "stagger" at their reduction.) But this appeal to the law of contradiction and the antinomies which the author regards as sufficient support for intellectualism brings us only in sight of the real problem, which concerns precisely the *nature* and functions of this law of contradiction and of the antinomies. And doubtless some blasé intellectualists whose minds have been "debauched by learning" may be surprised to find that the discovery of "certain laws of heredity with their fatal consequences," exemplifies the conflict between scientific and moral utility! "Dans de tels cas ca Science est mauvaise, et n'est plus utile que dans le sens scientifique"! (p. 50.)

The author attempts to make a test case for his central thesis of Professor Dewey's monograph on "Logical Conditions of a Scientific Treatment of Morality." And here again the author's capacity for getting at the problems involved may be judged from the fact that many of his points are based on alleged quotations which completely reverse the meaning of the original. For instance we read on page 86 of Anti-Pragmatisme: "If Dewey declares that while psychology shows that the moral judgment is determined by contingencies, psychology tells us nothing of the content of the moral ideal, and that therefore we must have recourse to transcendental considerations of metaphysics," etc. The original in the mono-

graph of Dewey (p. 21), reads: "Hence it is *futile* to insist that psychology can not give the moral ideal and that consequently there must be recourse, etc." Another illustration: "Anti-Pragmatisme" (p. 80) reads: "He (Dewey) tells us that when the action of character (or of subjectivism) becomes preferential in its effect, then the judgment *by this fact* becomes logical. But what then? As this character is not preferential in the scientific judgment, is the scientific judgment no longer logical?" But what Professor Dewey is very careful to tell us in the paragraph (The Monograph, p. 16) referred to in these quotations, is: (1) That character becomes preferential in effect when the situation is such that the part which character plays in the judgment has *"to be recognized";* when it is such that it "is necessary to take notice of it." (2) That, when the influence of character does *thus* become "preferential in effect," *character* (not the "judgment"), "as a practical condition, becomes logical." (Italics mine.) And here "becomes logical" means passes into, becomes the subject of judgment. Obviously the substitution of the term "judgment" for "character" makes a very pretty case of "contradiction" over which the author grows merry. As a fully guaranteed device for "discovering" contradictions and as a source of self-entertainment for one who enjoys them as much as does the author of Anti-Pragmatisme, this method is commended.

Into the issue itself we can not go. Suffice it to say that Professor Dewey is showing both the connection *and* the distinction, or rather the connection *through* the distinction, between logic and ethics. But his critic's method of thinking can not follow this. For him, if logic and ethics are different, they must be independent, or even "opposed."

This lack of recognition of connection and continuity in and through distinctions continues, of course, throughout the discussion of James and Schiller, to whom most attention is given, and accounts for the "captious" character of the criticism. Apparently the author regards it impossible for a pragmatist to use the terms "intellectual," "logical," or "scientific" without "fatal contradiction." But Professor Schinz does not distinguish between "intellectual" and intellectual*ism*, between "rational" and rational*ism*. Intellectualism or rationalism is the doctrine of an independent self-enclosed and self-sufficient world of pure thought. That pragmatism opposes intellectualism and rationalism does not mean that it is opposed to intellect or to reason; nor that is it a substitution of faith, or will or feeling, or anything else for thinking—for "abstract," "logical" thinking. On the contrary it holds that "abstract" thinking is one of the necessary constituents of a rich and

efficient type of experience; and that the higher the degree of abstraction of which thought is capable, the richer the possibility of the experience in which it functions. But pragmatism does teach that whatever heights or depths of abstraction thought reaches, it can not finally cut loose from the world of immediate impulse, instinct and feeling, and set up an independent, self-enclosed empire of pure intellect.

A. W. MOORE.

UNIVERSITY OF CHICAGO.

SOCIETIES

A REPORT OF THE MEETING OF THE NORTH CENTRAL ASSOCIATION OF TEACHERS OF PSYCHOLOGY IN NORMAL SCHOOLS AND COLLEGES

REPORT OF THE SECRETARY

A MEETING of the North Central Association of Teachers of Psychology in Normal Schools and Colleges, was held at the University of Chicago, April 3, 1909. The sessions were held in Emmons Blaine Hall, the School of Education. About forty teachers of psychology from normal schools and colleges in seven of the North Central States were in attendance.

ABSTRACTS OF PAPERS

A Way of Simplifying the Introductory Course in Psychology: ROWLAND HAYNES.

The purpose of the introductory course is the formation in the student of habits of observation, explanation, and application to daily life of the facts observed. Hence the course may be simplified by grouping around the topics of description of consciousness, states and processes, explanation and function for present adult life. In the study of explanation the student should come to see that an explanation is the pointing out of the relation of invariable antecedent to consequent between the group of facts to be explained and certain other groups of facts. Hence the course may be further simplified by arranging the favorite groups of facts to which psychology goes in explanation thus: (1) Psychological facts of other conscious states and processes, (2) physiological facts of the make-up and growth of the nervous system, (3) facts of child life, (4) facts of race history, etc. This indicates the use to be made of the functional view of consciousness in explanation. Pointing out the need for adjustment or the value of certain processes for adjustment, gives no explanation. It is necessary to point out the invariable

antecedents in the situations in race, or individual history which caused the adjustment.

Teaching the Organic Conception in an Introductory Course: J. B. MINER.

The paper called attention to the inadequate summaries of the organic conception of the mind to be found even in text-books which emphasize the functional and genetic points of view. The writer suggested that the difficulty which the students have in grasping the organic conception when applied to the mind might be partially overcome by paying more attention to a carefully summarized description of the organic nature of consciousness. He set forth, by way of illustration, the four features which he had used in defining the conception and the examples of mental facts which he had found most serviceable under each. The characteristics were the following: First, that the mind is made up of processes, each of which has its specific purpose in adapting the organism to its environment; second, that these functions are mutually dependent and organized into unified conduct; third, that the mind develops during the individual life; fourth, that the mind through inheritance is related to the past activities of the race. It was further suggested that it might be wise to point out the striking difference between the mind and physical organisms in that consciousness does not have a continuous observable existence. This makes it desirable to describe man scientifically as a psychophysical organism, and speak of the organic nature of the mind rather than of the mental organism. The writer suggested that he had found that this summary might well be introduced late in the course, for example, after the treatment of the cognitive functions.

A Device—By which Physiological Concepts may be Employed in Teaching Psychological Processes: N. A. HARVEY.

Every mental process is accompanied by a corresponding physiological change. This change always, or nearly always, takes the form of the transmission of a nervous impulse through a nervous arc. This nervous impulse may be discussed in terms of a current. Every current, whether it be a current of water, of electricity, or a nervous current, has certain elements that make it a current. In every current there must be a conductor, some means of insulation; the current always encounters resistance, it is directed in its course by some means, it exercises some kind of an influence upon the surrounding space, it is caused to flow by some kind of a force, and it is capable of doing some kind of work. In the case of the nervous current we shall be able to identify every element of the current with its psychological concomitant.

As there is one word, current, to express all the physiological elements discoverable in the nervous impulse, so we may employ a single word, psychon, to express all the concomitants of the physiological current elements. It is preferable to use a new word, to express this new idea, rather than to use the term "states of consciousness," or "consciousness," or "stream of consciousness," or "mind." It is believed that every relation that psychology has yet discovered between the various mental processes can be described in terms of the psychon, or in terms of their physiological concomitants.

It is impossible from the very nature of the case to prove directly the propositions here advanced, and it is probable that what actually occurs is a hundred times as complex as what has been indicated here. But the value of an hypothesis does not depend upon the possibility of demonstrating its truth. It enables us to picture in luminous terms the relation existing between mental processes.

Conflicting Ideals in the Teaching of Psychology: JAMES R. ANGELL.

(This paper will be published in the *Educational Bi-Monthly.*)

A Written Recitation and a Class Experiment: C. E. SEASHORE.

An explanation was given of a method of conducting a written recitation by which large classes may be handled. "There are," Professor Seashore stated, "at least three advantages in this mode of recitation; it encourages and secures systematic analysis of the text by the student when he is at ease in his room; it leaves the class-hour for lectures, demonstration, experiments, and discussion; it secures full and specific recitation from every student every day, and develops logical presentation." He then described a form of class experiment which complies with the following principles: "(1) Every individual student shall take active and responsible part in the experiment; (2) the experiment shall be sufficiently intensive to make it vital, and (3) each step in the experiment shall be explained and interpreted in a printed leaflet."

It was recommended that psychologists cooperate in producing a series of such experiments, each to be printed separately in sixteen-page leaflet edited by a representative committee. An illustration of such an experiment was given.

Relearning a Skillful Act: An Experimental Study in Neuro-Muscular Memory: EDGAR JAMES SWIFT.

The experiment consisted in relearning the muscular feat of keeping two balls going with one hand, catching one and tossing it while the other was in the air. The original investigation, in which the skill was first acquired, was completed six years before this memory study was undertaken. It was found that the subject had lost a large part of his former skill, but the process of relearning was

rapid, requiring only eleven days against forty-two in the regular learning practice six years previously. Educational applications were suggested.

The Value of Social Psychology: ERNEST TALBERT.

An adequate social psychology must proceed from the analysis of fundamental instincts, "dispositions" and sentiments, showing how they work out in the life of groups. Our prevalent procedure, with over-emphasis upon cognition, exaggeration of the possibilities of laboratory experiment, the ignoring of the place of feeling, and an individualistic attitude, has not been altogether satisfactory, and the failure of analysis and application shows itself in a crude pleasure-pain political economy, individualistic political and legal theory, and considerable chaos in educational practice.

For college students the study of social psychology has some points of advantage over the conventional treatment of individual psychology. A discussion of public opinion, instincts and their working, suggestibility, the mob, custom, conventionality, the imitation cycle theory, etc., with reference to and criticism of such representative writers as Wundt, Tarde, Baldwin, Ross, and McDougall, seems to give much of the introspective practice of the "pure" psychology, combined with a measure of objectivity and an appreciation of the relation of the individual to the group. With its group-background it gives greater significance to the individualizing forces, creates a sense of the importance of the educational process as the technique of carrying over the psychical inheritance from generation to generation, and, as regards religious implications, acts as an antidote to a worship of the group excesses peculiar to "revivals."

It is not a thoroughgoing statement to say that we must *now* proceed to the stage of application of our psychological technique. There has always been some application: the problem is to determine in what directions the use shall be put. In so far as we do apply its findings, psychology is reconstructed in content and standards. The need is to enlarge the scope of its reaction upon social life.

A Course in Applied Psychology for Teachers: FRANK G. BRUNER.

The experience of those associated with teachers in an administrative and professional way has led to the conviction that the stock courses in psychology, those which treat of it in a systematic, analytic or genetic way, have been, in general, strikingly barren of practical results. What teachers require is a more detailed study of certain mental processes involved in the acquisition of the ordinary schoolroom arts. And this study, too, needs to be pursued from the

view-point of the child's mental processes rather than from those of the adult.

In keeping with this point of view, there was then outlined a course in applied psychology which the writer projected and had pursued with some teachers in the Chicago public schools. The course consisted of a discussion and elaboration of data which the teachers collected in their own schoolrooms as a result of directed observations and experimentations, with reference to the ways in which children learn to read, grow into a number consciousness, can acquire accurate spelling habits most effectively, etc. These observations and experimentations were supplemented by readings and reports of published experimental results on the topics in question. The significant outcome of the course was this—that as a result of noting the seeming antagonism between the teacher's introspective method of getting results, and the child's observed method, there was generated a truer and more systematic teaching insight and intuition.

Social Psychology: CHARLES H. JUDD.

Psychology has reached the stage of applications. Its earlier work was the development of methods and the collection of material. The most fruitful line of application which can be developed at the present time is that which makes psychology the explanatory basis of the social sciences. Illustrations of the possibility of thus utilizing psychological material were given in full by taking up such problems from political economy as the history of credit. The earliest stages of barter are due to the fact that primitive man is purely perceptual in his intellectual process. Later he developed more and more elaborate systems of ideas which have their corresponding social institutions in our modern type of credit.

The use of tools is a second line of mental development which can be clearly traced. The earliest tools were made in a purely imitative way because the range of comprehension of primitive man was limited. As the ability to concentrate attention upon material and upon principles of construction grew, the complexity of the tool also increased and a complexity of the process of manipulation reached the stage which appears in modern industrial life.

The recognition of such explanations of human civilization as are suggested by the two examples above given, make it clear that a principle of evolution different from that of the biological sciences is necessary to account for human progress. The higher forms of intelligence are distinct factors in the forms of evolution. The ability to have ideas and to enlarge upon them is a distinctive human trait which the animals do not possess. The recognition of an intellectual type of evolution gives to educational practise a larger foundation than that which it can derive from any purely biological theory of evolution.

THE SECRETARY OF THE ASSOCIATION.

REVIEWS AND ABSTRACTS OF LITERATURE

What is Pragmatism? JAMES BISSET PRATT, Ph.D. New York: The Macmillan Co. 1909. Pp. xii + 254.

Professor Pratt's book is a most welcome and timely contribution to the discussion of pragmatism. It is an excellent summary of the current arguments against pragmatism, written in a very attractive style. The book fulfills the purpose stated by the author in his preface: "For though I have nowhere allowed the desire for simplicity and popularity to interfere with thoroughness of treatment, and though I have used technical language where exactness demands it, my aim has been throughout to give an exposition and critique of pragmatism which the general reader could follow without too much effort." Both the general reader and the technical one will be well rewarded by giving the book a reading, not only because, whether he is in sympathy with the author's standpoint or not, it will help to focus the discussion of the subject, but also because it has a spicy flavor of its own which makes the reading of it a pleasure.

The book is in the form of six lectures with the following titles: "Meaning and Method in Pragmatism," "The Ambiguity of Truth," "The Pragmatic View of the Truth Relation," "Pragmatism and Knowledge," "Pragmatism and Religion," "The Practical Point of View." In each lecture the author shows at what points pragmatism, to his mind, contains inadequacies or inner contradictions in dealing with the problem indicated by the title.

Professor Pratt selects three writers on pragmatism as spokesmen for the doctrine, Professor James, Professor Dewey and Dr. Schiller. He considers Professor Dewey's formulation of the standpoint the most logical and consistent of the three—a view that, of course, for Professor Pratt, makes Professor Dewey's pragmatism also the most reprehensible. It is obviously impossible within the limits of a book review to give an adequate summary of arguments, or refutation of them, even if one could! I shall content myself with pointing out where, on a few fundamental questions, Professor Pratt's discussion seems to me to fail in being convincing.

In the first place, most of the serious difficulties with pragmatism which Professor Pratt encounters, seem to me to arise from a fundamental difference of opinion with regard to a problem which receives no explicit discussion in the book—the problem of reality. Professor Pratt's excuse for not discussing it is that it is "as yet in so embryonic and unformed a condition that it would be premature and unfair for a non-pragmatist to try to state it" (p. 178). Although most of the problems which Professor Pratt discusses hinge upon one's view of the relation of the idea to reality, he approaches them, nevertheless, with a preconceived conviction that reality, in order to be anything more than mere subjective experience, must have its *existence* independent of the thought which knows it. The contention of pragmatism is that we may regard reality as constructed in the knowledge process, and yet may distinguish it sharply from the mere subjective experience which is the instrument of

its construction. Professor Pratt is willing to admit that an existence postulated as independent of the knowledge process can never itself get into knowledge, but he insists that the only way we can keep from "lifting ourselves by our boot straps" is at least to *mean* such a reality —a proceeding in which he can see no difficulties but manufactured ones. I do not feel that I should be any more flippant than Professor Pratt is at times if I should forthwith accuse him of being, after all, a pragmatist in his fundamental assumption, for his only justification for assuming a reality whose existence is independent of the thought which knows it, is the pragmatic one that he can not see how to make his universe work without it.

The deadlock between Professor Pratt and the pragmatists on the subject of truth is only another manifestation of their opposed views of reality. For Professor Pratt, of course, truth is correspondence between an idea and an already existing reality. The difficulties with this view of truth which the pragmatist points out do not seem to him genuine. He is quite undaunted by the impossibility of ever *testing* that kind of correspondence. To him there is no insuperable difficulty in holding that the "trueness" of an idea lies in its correspondence with an already existing reality, while the test of its truth is the consequences to which it leads. He accuses the pragmatist of committing a *logical* error when he identifies the trueness of an idea with the process which tests it. But surely it is within the *logical* possibilities that the trueness of an idea should be constituted by its successful functioning, or that, in Professor Pratt's words, its "trueness" and its "truth" should coincide. The view seems *illogical* only to one who is already committed to the conviction that trueness must exist before it can be tested. Nor is it a damning admission to the pragmatist to agree that a given content of thought may be truth under one set of circumstances and falsehood under another, because for him truth is never inherent in the content of an idea, but always in its function. One is tempted to feel that Professor Pratt's refutation of the pragmatic view of truth consists in showing that the conclusions to be drawn from it are not in accord with a metaphysics which pragmatism expressly repudiates.

In dealing with the problems of meaning and method, Professor Pratt seems to me to have failed to interpret pragmatism correctly in two respects. When he makes the statement that "the distinction between a red house and a green house does not consist in a difference of practise" (p. 18), he is implying that the ultimate qualities of sensation are parts of meaning, a view which is certainly not that of the pragmatist. The sensory qualities he accepts as the ultimate given content of experience behind which we can not go. In and of themselves, redness and greenness have no meaning. It is only as they serve to guide action that they acquire it. There is no absurdity in the statement that the difference in *meaning* between a red house and a green one does, as a matter of fact, go back to a difference in practise.

Secondly, Professor Pratt's failure to find the pragmatic view of meaning as inherent in anticipated consequences satisfactory, is due, at

least in part, to a failure to follow the pragmatic method to the extent of selecting a total concrete situation from actual experience as a basis for reasoning. An enlightening distinction may be made between "dead" and "live" judgments. A dead judgment is the mere statement of the outcome of some completed process of thought. One can not draw reliable conclusions about the thought process from these shells which are left behind after the animal is dead and gone. The judgment must be resuscitated in imagination, and regarded *as it was when it was made.* The illustration taken from Professor James of the meaning attaching to ideas at the last moment of existence is for this reason an unfortunate one. But if Professor Pratt would sit down and really try to imagine with the utmost vividness possible what his state of consciousness would be if he were knowingly facing the last moment of existence, I think he would be almost willing to admit that the meaning would have evaporated from all ideas, except in so far as he could forget the state of affairs sufficiently to adopt the habitual attitude of future reference. No man under those circumstances would *be* reflecting on the problem as to whether Mr. James or Mr. Bradley wrote "Pragmatism." Professor Pratt constructs a situation which is impossible, and then argues most improbably about what would happen if it were true. Moreover, if he were really putting himself for the moment into the pragmatist's shoes, he would not talk about the past consequences of an idea. The pragmatist insists that one must take the idea at the moment of its existence, and in its actual setting, in order to judge wherein its meaning lies. At the moment of its existence, an idea has no past consequences, it can have only anticipations of future ones—anticipations derived, to be sure, from past experience, but whose present importance is that of a guide in dealing with the situation at hand.

Finally, bearing in mind the criticism just made, I can not see why the pragmatist should object to as broad an interpretation of his doctrine as Professor Pratt wishes. The pragmatist does not contend that his theory of meaning is entirely new in the history of thought, but merely that it has never before been consistently elaborated. Professor Pratt is quite right in saying that one can find passages in Mr. Bradley's writings which state it excellently. The point the pragmatist makes is that a philosophy which regards reality as independent (in its existence at least) of thought, as Mr. Bradley does, can not consistently hold the view that meaning is inherent in consequences. Just as truth from such a standpoint must consist in correspondence with "reality," so meaning must logically be regarded as reference to "reality"—a concept quite distinct from that of meaning as constituted by consequences. The pragmatist's quarrel with Mr. Bradley is that he finds both concepts of meaning unreconciled and, as he believes, unreconcilable, in Mr. Bradley's writings. The problem of meaning, like that of truth, brings us back to the opposed views of the metaphysics of reality, and on this ground, it seems to me, the battle must be fought out.

HELEN THOMPSON WOOLLEY.

OMAHA, NEBRASKA.

The Problem of Logic. BOYCE GIBSON. New York: The Macmillan Co. 1908. Pp. ix + 500.

Mr. Gibson tells us in his preface that the work under consideration has "grown up and taken shape under the chastening influence of college teaching." It is, therefore, not to be expected that the volume should be a contribution to the advancement of logical thought, but the reader may demand of it a clear and consistent point of view with respect to the matter involved, and in this he will not be disappointed. It is a work preeminently suited to the needs of the teacher of logic who is annoyed by the lack of precision and consistency in most contemporary works and who lacks either the time or the interest to reorganize thoroughly his own opinions.

It is impossible to consider a book such as this in detail, but there are certain general features that at once warm our hearts: for example, while current formal logic does not loudly demand a philosophic background, the need is nevertheless implicit, and it is refreshing to find it frankly recognized: "I am, indeed, persuaded that the drift of the present work is convergent with the line of the Pragmatic Reformation, and that the stress laid on relevancy is a vital bond of union between ourselves and the pragmatists." The author's philosophy is not thoroughly pragmatic, but its idealistic elements do not bear weightily on logic. Mr. Gibson offers the following provisional definition of truth: "Truth is the unity of ideas as systematically organized through the control exercised by relevant fact," and, throughout, the constant references to this control are of primary importance.

From a reviewer's point of view the book falls into four parts: (§ I.–II.) the relation of logic to language, *i. e.,* the function of words, definition, the predicables, division, classification, scientific terminology and nomenclature, connotation and denotation, concrete and abstract terms; (§ III.–IV.) the logical proposition, its forms, meanings, and relations to the laws of thought; (§ V.–IX) formal deduction and its fallacies; (§ X.–XIV.) induction.

The first part is developed under the concept of meaning, or that which tells us what an object is in relation to a specified interest or purpose. Its details might well be the grounds of considerable comment, but such comment would be in the interest of greater simplicity and propriety in the use of language only. For example, is it necessary or expedient to define *intension* so that *intension* equals *connotation* + *denotation* (p. 72)? Mr. Gibson has at least expressed himself clearly, although he seems to us to have been everywhere too anxious to make a place for traditional expressions instead of meditating on the utility of Occam's razor.

The concept of meaning dominates the second part of this work also. The most interesting feature here is the treatment of the principle of identity as an Hegelian identity-in-difference (p. 97), in which form, the author seems to think, this law may be *the* law of thought, although he adds, as a concession, the laws of contradiction and of excluded middle. To Professor Stout is attributed an important section disclaiming, on

excellent and sound grounds, the relating of these laws to time. The forms of the traditional analyses of propositions are retained and given meaning in rather satisfactory fashion, considering that modern symbolic logic is wholly ignored; this appears, for example, in the emphasis of "genuine logical denial," and in the assertion of the irreducibility of hypotheticals to categoricals (p. 139) which assertion has meaning, but probably not within the purpose of formalism.

Formal inference is introduced as a substitution of the validity interest for the truth interest, and the extensive point of view is "selected as most adequately meeting the requirements of a formal logical treatment." Existential questions which threaten the validity of Darapti, Fesapo, and Bramintip, are entirely untouched, and the short section devoted to unorthodox syllogisms, such as "X is greater than Y, Y is greater than Z, etc.," is inadequate and somewhat inaccurate: for example, the copula in the simple categorical syllogism is stated as = (p. 251)—an absurdity when the extensive point of view has been adopted. The examples are excellent and especially so in the well-classified treatment of fallacies, which includes detailed formal discussion of such classic arguments as Zeno's paradoxes (p. 290), and the Litigiosus (p. 293). Inference is justified against Mill's criticisms because its end is not novelty but logical irresistibility.

The section devoted to induction is most touched by the pragmatic wand. Fidelity to relevant fact is the expression of the truth interest, and therefore induction proper includes Mill's induction, deduction, and verification. Why might not the book have had a better form and expressed this in its order of exposition? Again, the working out of the examples is most commendable (cf. the development of astronomical theory, pp. 329–333, and especially, Ch. XLVI., pp. 422–444). The inductive postulate is determinism.

The author promises a sequel that shall deal "with the logical problem in its more philosophical aspects" (p. viii) and which may discuss the principles of mathematics in their logical bearing. But while not contesting the interest and importance of symbolic logic, the incorporation of it into the massive promised system is looked upon as improbable, or impossible, and if the incorporation of it were to mean a new and exhaustive statement of its results in their details the reviewer would heartily say Amen! but when symbolic logic, moved by the consistency interest, seems able to do away with the distinction between positive and negative propositions, and when Mrs. Ladd-Franklin has demonstrated that one simple form underlies all syllogistic, it is unfortunate that those whose interest moves them to undertake such exhaustive treatments of logic should not try to incorporate some of these results in their systems, and so make way with at least a part of that cumbrous machinery inherited from antiquity, which logicians still accept, patch up, and transmit to the next generation.

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The Relations of Comparative Anatomy to Comparative Psychology. LUDWIG EDINGER. Translated from the German by H. W. RAND. *The Journal of Comparative Neurology and Psychology,* November, 1908.

The aim of this article is to point out how comparative anatomy studied in connection with the observation of the organism may be of service to comparative psychology.

The author divides the brain into the palæencephalon and the neencephalon. The former, which is the oldest part of the brain, is present in all forms of life from the cyclostomes to man. Its general type remains unchanged throughout the evolutionary scale although the different parts may vary greatly in size. That a knowledge of the palæencephalon is of value to the sense psychologist is shown by a study of that part of it which has to do with the sense of smell. The anatomy of this portion of the brain reveals a constant arrangement and microscopic structure in all vertebrates from man to the cyclostomes. Because of this fact we may infer that all animals which possess this structure smell, even when we can not infer anything very definite from their behavior.

In the next place, a knowledge of anatomy reveals new problems for the sense psychologist. For example, in birds we find a large fiber tract which leads from the nucleus of the trigeminus, and terminates in a field known as the lobus parolfactorius. In fact, in all vertebrates up to mammals there evidently exists a sense which is localized about the mouth and has its center in the lobus parolfactorius. This lobe which is well developed in birds and certain lizards, and also in those animals in which the snout plays an important part, has almost entirely disappeared in man. Here we have an oral sense which is of the greatest importance to certain forms of life, yet it is a sense about which we, as yet, know almost nothing.

The study of the bony fishes is especially important because in them the palæencephalon alone is present. By a careful study of their behavior we can determine the activities which are characteristic of the palæencephalon. And "since it is certain that the palæencephalon persists quite unchanged even after a well-developed neencephalon has been added to it, there is no ground for regarding those activities which we recognize as palæencephalic in one class of animals as anything else, or as otherwise localized in higher animals. Furthermore, we may regard an entire series of activities as common to all vertebrates, and we may then seek to ascertain how other activities are added to those when a new structure is added to the palæencephalon. All sense impressions and movement combinations belong to the palæencephalon. It is able to establish simple relations between the two, but it is not able to form associations, to construct memory images out of several components. It is the bearer of all reflexes and instincts." If the palæencephalon can not form associations, then it is clear why animals which possess only the palæencephalon do not respond to certain sense stimuli, for these stimuli can not mean anything to them. It is the biological stimuli alone which arouse them to action. It is evident that here is an inviting field for the psychologist.

The neencephalon, the bearer of the cortex, is present as a rudiment even in the selachians, and becomes more and more conspicuous in the amphibians, and especially in the reptiles. It is in the neencephalon of reptiles that there appears for the first time a mechanism which provides for the possibility of association. We can now "declare with certainty that the oldest cortex becomes connected with those parts of the palæencephalon which serve the sense of smell and the oral sense, and subsequently other cortex regions are gradually superadded to this."

With the appearance of the neencephalon occur marked changes in the behavior of the organism. These changes as they appear in the reptiles may be summarized as follows: They are no longer dependent on the sense impressions of the moment but are influenced by earlier impressions; they learn more easily than fishes and amphibians; they associate certain sense impressions which are connected with the olfactory and oral senses; to a certain extent they foresee, and they exhibit individual differences. These facts are without doubt due to the appearance of the neencephalon. It is here that the true psychological states make their appearance.

From the brain of the reptiles two types of brain are evolved. One, the type found in the lower mammals, develops through an increase in the size of the cortex; the other type, found in birds, is characterized by a marked increase in the size of the palæencephalon. Because of this marked increase in the size of the palæencephalon we find that the instinctive activities of birds are much more varied and complex than those of amphibians and reptiles. In fact, in birds the instincts are so complex that it is difficult to tell which activities are dependent upon the palæencephalon, and which upon the neencephalon. It suggests the possibility of there being neencephalic instincts. The fact that birds make more use of sight than reptiles is easily accounted for, as birds are the first to possess an optic tract leading from the palæencephalon to the cortex. This means that through association these optic impressions are capable of being utilized later, which is not possible in the case of reptiles.

In the mammals we find a brain which has so large a neencephalon that we may expect a subordination of the reflexes and instincts to associative and intelligent action. And this seems to be the case with those mammals in which the neencephalon includes more than half the bulk of the entire brain.

Although our knowledge of the mammalian brain is by no means complete yet it is sufficient to establish the point that man does not possess the greatest associative power in all fields, for the "degree of development of certain parts of the cortex makes it appear highly probable that many mammals far excel man in their capacity for observation and association in certain fields."

This article contains valuable suggestions for the comparative psychologist. In the first place, it shows that much useless work has been done because of the psychologist's ignorance of brain anatomy. For example, what folly to spend time in devising experiments to test association in animals which do not possess the associative structure!

In the second place, the article suggests the importance of choosing

certain animals for experimentation, not simply because they are easy to study, but because they represent important stages in evolution. It is evident that a careful study of the bony fishes which possess the palæencephalon alone, and the reptiles which possess a very simple neencephalon will be of marked value when it comes to analyzing the activities of the higher mammals.

But in order for the comparative psychologist to profit by these suggestions it is necessary for him to have a thorough knowledge of brain anatomy. This means that our students of comparative psychology can advantageously spend more time in the study of biology and anatomy than they have been doing.

In a field as new and as broad as that of comparative psychology it is highly essential that the work should be done on those animals where it will count for the most as a basis for subsequent investigations.

CHARLES SCOTT BERRY.

UNIVERSITY OF MICHIGAN.

JOURNALS AND NEW BOOKS

ARCHIV FÜR GESCHICHTE DER PHILOSOPHIE. Band 15, Heft 2. January, 1909. *Aristoteles' Urteile über die pythagoreische Lehre* (pp. 145–165): O. GILBERT. – An argument to show that the Pythagoreans identified number not with things, but with what Aristotle would call the form of things, existing not apart from but in the things. *Die Entwicklungslinie der Philosophie im Kulturbereiche des Islam* (pp. 166–177): M. HORTEN. – In Gazali, A.D. 1111, the Thomas Aquinas of Mohammedanism, the four tendencies of early Islamic philosophy, blended. Then advance ceased till modern science invaded Islam in 1850. *Ein entschiedener Verfechter des Indeterminismus—W. King* (pp. 178–191): A. SEIBT. – King, a predecessor of Leibniz, found the will to be free in that it is not determined by the nature of its object, being able to choose the indifferent or the disagreeable. *Herder und Kant, Philosophieren und Philosopher* (pp. 192–196): G. E. BURCKHARDT. – *Die Kosmologie des Rauchopfers nach Heracleits fr. 67.* (pp. 197–229): W. SCHULTZ. – This fragment is an interpretation of the burnt offering, and in the words used and their arrangement is hid much numerical symbolism here first unraveled. *Aristote et le Traité des Catégories* (pp. 230–251): E. DUPRÉEL. – "The Categories" is post-Aristotelian, and contains nothing good except that which is found elsewhere in Aristotle's own works. *Die Tendenzen der platonischen Dialoge Theaitetos Sophistes Politikos* (pp. 252–263): J. EBERZ. – The last dialogue of this trilogy examined especially in reference to Plato's Syracusan experiences. *Jahresbericht über die Philosophie im Islam* (pp. 264–287): M. HORTEN. – Summaries of recent books and articles, such as to give the names of a multitude of writers and their works in metaphysics, ethics, logic, etc., from the early days of Islam to the present. *Die neuesten Erscheinungen. Historische Abhandlungen in den Zeitschriften.*

Bonilla y, San Martin Adolfo. *Historia de la Filosofía Española (desde los tiempos primitivos hasta el siglo xii)*. Madrid: Librería General de Victoriano Suárez. 1908. Pp. liv + 463.

Dickinson, G. Lowes. *Is Immortality Desirable?* The Ingersoll Lecture, 1908. Boston and New York: Houghton, Mifflin Co. 1909. Pp. 63. $0.75 *net.*

Jones, Rufus M. *Studies in Mystical Religion.* London: Macmillan & Co. 1909. Pp. xxxviii + 518. $3.50 *net.*

Spinoza's Short Treatise on God, Man, and Human Welfare. Translated from the Dutch by Lydia Gillingham Robinson. Chicago: The Open Court Publishing Co. 1909. Pp. xxiv + 178.

NOTES AND NEWS

THE May number of the *Psychological Review* is devoted to the influence of Darwin. The contents are as follows: "The Influence of Charles Darwin upon Historical and Political Thought": Arthur Twining Hadley; "The Influence of Darwin on Psychology": James Rowland Angell; "Darwin and Logic": J. E. Creighton; "The Influence of Darwin on Sociology": Charles A. Ellwood; "Darwin and Evolutionary Ethics": James H. Tufts; "The Influence of Darwin on Theory of Knowledge and Philosophy": J. Mark Baldwin.

DR. A. MÜLLER, director of the astronomical observatory on the Janiculum in Rome, is making use of the official papers in the case of Galileo, recently published, to prepare two works: "Galileo Galilei und das koperikanische Weltsystem" and "Der Galilei Prozess nach Ursprung Verlauf und Folgen." Dr. Müller presents the point of view of the Catholic Church.

PROFESSOR JAMES MARK BALDWIN addressed the superior board of education in the City of Mexico on April 30 on the functions and ideals of a university.

M. MILHAUD, professor of philosophy at the University of Montpellier, has been appointed professor of the history of philosophy in relation to the sciences at the University of Paris.

THE next meeting of the American Psychological Association will be held in Boston in affiliation with the American Association for the Advancement of Science.

PROFESSOR WILHELM WUNDT, of the University of Leipzig, has been elected a foreign associate of the National Academy of Sciences at Washington.

ANTONIO HERMANDEZ FAJARNES, professor of logic and psychology at the University of Madrid, died on March 27.

MAX MEYER, professor of experimental psychology at the University of Missouri, will go in the latter part of May to Europe on a year's leave of absence.

DR. J. F. MESSENGER, professor of psychology and education at the State Normal School, Farmville, Virginia, has been called to the University of Vermont.